CLAIMS

1. A method for controlling application of electric power from a power source to a load, that method comprising:

detecting a magnitude of electric current flowing to the load and producing a first signal level that indicates the magnitude of electric current;

a comparing first signal level to a reference signal level which comparison produces an output signal;

altering one of the first signal level and the reference signal level in response to variation of voltage applied to the load, which results in the output signal indicating when electric power consumed by the load exceeds a threshold level; and

controlling flow of electric current from the power source to the load in response to the output signal.

2. The method as recited in claim 1 wherein the first signal level and the reference signal level are voltage levels.

3. The method as recited in claim 1 wherein detecting a magnitude of electric current comprises:

providing current sensing resistor through which electric current flows from the power source to the load, wherein voltage across the current sensing resistor indicates a the magnitude of that electric current;

connecting a first input of an operational amplifier to a first side of the current sensing resistor; and

connecting a second input of the operational amplifier to a second side of the current sensing resistor.

4. The method as recited in claim 1 wherein the altering comprises detecting a load voltage applied to the load to produce a second signal level that indicates the load voltage; and combining the second signal level with the one of the first signal level and the reference signal level.

5. The method as recited in claim 1 wherein the altering comprises producing a second signal level corresponding to an amount that the load voltage exceeds a defined threshold; and combining the second signal level with the one of the first signal level and the reference signal level.

6. The method as recited in claim 1 wherein controlling flow of electric current comprises disconnecting the load from the power source.

7. An apparatus for controlling application of electric power from a power source to a load, that apparatus comprising:

a current sensing circuit that detects a magnitude of electric current flowing to the load and producing a first signal level that indicates the magnitude of current;

a comparator connected to the current sensing circuit and having a first input to which the first signal level is applied, a second input connected to a source of a reference signal level, and a comparator output at which an output signal is produced in response to comparing the first signal level and the reference signal level;

a circuit branch connected to the comparator and which alters one of the first signal level and the reference signal level in response to variation of voltage applied to

the load, wherein results in the output signal indicating when electric power consumed by the load exceeds a threshold level; and

a device connected to the comparator output and controlling flow of electric current from the power source to the load in response to the output signal.

8. The apparatus as recited in claim 7 wherein the first signal level and the reference signal level are voltage levels.

9. The apparatus as recited in claim 7 wherein the current sensing circuit comprises:

a current sensing resistor, voltage across which indicates the magnitude of current flowing to the load; and

an operational amplifier having a first input connected to a first side of the current sensing resistor, a second input connected to a second side of the current sensing resistor, and producing the first signal level.

10. The apparatus as recited in claim 7 wherein the circuit branch comprises an impedance element coupling the first input of the comparator to one of the first and second sides of the current sensing resistor.

11. The apparatus as recited in claim 7 wherein the circuit branch comprises:

a circuit element connected to the current sensing resistor and producing a signal indicating when voltage applied to the load exceeds a defined magnitude; and

a second operational amplifier having an input coupled to the circuit element and having a second output connected to the second input of the comparator.

12. The apparatus as recited in claim 7 wherein the circuit branch comprises:

a first resistor

a Zener diode connected in series with the first resistor between the current sensing resistor and circuit ground, thereby forming a sensing node between the first resistor and the Zener diode;

a second resistor, a third resistor and a fourth resistor connected in series coupling the sensing node to the second input of the comparator; and

second operational amplifier having one input connected to a point between the second resistor and the third resistor, another input connected to the circuit ground, and an output connected to another point between the third resistor and the fourth resistor.

13. The apparatus as recited in claim 7 wherein device selectively disconnects the load from the power source in response to a signal at the comparator output.

14. An apparatus for controlling application of electric power from a power source to a load, that apparatus comprising:

a current sensing resistor, voltage across which indicates a level of current flowing to the load;

an operational amplifier having one input connected to a first side of the current sensing resistor, another input connected to a second side of the current sensing resistor, and having an output at which an output voltage is produced which indicates the level of current flowing to the load;

a comparator having a first input coupled to the output of the operational amplifier, a second input connected to a source of a reference voltage, and a comparator output;

a power limit resistor connected between the one input of the comparator and one of the first side and second side of the current sensing resistor; and

a disconnect device connected to the comparator output and selectively disconnecting the load from the power source in response to a signal at the comparator output.

15. The apparatus as recited in claim 14 further comprising a transistor having a control electrode connected to the output of the operational amplifier and a conduction path connecting the first input of the operational amplifier to the one input of the comparator.

16. The apparatus as recited in claim 14 further comprising a bias resistor coupling the one input of the comparator to ground.

17. The apparatus as recited in claim 14 further comprising an input resistor coupling the first input of the operational amplifier to the first side of the current sensing resistor.

18. The apparatus as recited in claim 14 further comprising:

a transistor having a control electrode connected to the output of the operational amplifier and a conduction path connecting the first input of the operational amplifier to the one input of the comparator;

an input resistor coupling the first input of the operational amplifier to the first side of the current sensing resistor; and

a bias resistor coupling the one input of the comparator to ground.

19. An apparatus for controlling application of electric power from a power source to a load, that apparatus comprising:

an input terminal;

a current sensing resistor connected between the input terminal and the load, wherein voltage across the current sensing resistor indicates a level of current flowing to the load;

a first operational amplifier having a first input connected to a first side of the current sensing resistor, a second input connected to a second side of the current sensing resistor, and having a first output at which an output voltage is produced which indicates the level of current flowing to the load;

a comparator having a first comparator input coupled to the first output of the first operational amplifier, second comparator input connected to a source of a reference voltage, and a comparator output at which an output signal is produced;

a circuit element connected to the current sensing resistor and producing a control signal indicating an amount that voltage applied to the load exceeds a defined magnitude;

a second operational amplifier having an input coupled to the circuit element and having a second output connected to the second input of the comparator, wherein the second operational amplifier alters voltage at the second input in response to the control signal so that the output signal of the comparator indicates when power consumed by the load exceeds a threshold level; and

a disconnect device connected to the comparator output and selectively disconnecting the load from the power source in response to a signal at the comparator output.

20. The apparatus as recited in claim 19 wherein the circuit element comprises a Zener diode.

21. The apparatus as recited in claim 20 further comprising:

a first resistor coupling the Zener diode to circuit ground, thereby forming a sensing node between the first resistor and the Zener diode; and

a second resistor, a third resistor and a fourth resistor connected in series between the sensing node and the second input of the comparator;

wherein the input of the second operational amplifier is connected to a point between the second resistor and the third resistor, and the second output of the second operational amplifier is connected to another point between the third resistor and the fourth resistor.

22. The apparatus as recited in claim 19 further comprising a transistor having a control electrode connected to the output of the first operational amplifier, and having a conduction path that connects the first input of the first operational amplifier to the first comparator input.

23. The apparatus as recited in claim 19 further comprising a bias resistor coupling the one input of the comparator to circuit ground.

24. The apparatus as recited in claim 19 further comprising an input resistor coupling the first input of the operational amplifier to the first side of the current sensing resistor.